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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,524	09/15/2003	Michio Horiuchi	300.1124	8037

21171 7590 12/18/2006  
STAAS & HALSEY LLP  
SUITE 700  
1201 NEW YORK AVENUE, N.W.  
WASHINGTON, DC 20005

EXAMINER
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WALKER, KEITH D

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/18/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	Application No. 10/661,524	Applicant(s) HORIUCHI ET AL.	
	Examiner Keith Walker	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.  
     4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/15/06, 10/29/03, 8/31/05</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I, Claims 1-3 & 5-15 in the reply filed on 10/2/06 is acknowledged. Claim 4 is withdrawn without traverse.

Claims 1-3 & 5-15 are pending examination and are rejected for the reasons below.

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

### ***Information Disclosure Statement***

The information disclosure statements filed on 9/15/06, 10/29/0<sup>3</sup> & 8/31/05 have been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

The drawings received on 9/15/03 are acceptable for examination purposes.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claims 1-3 & 5-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, it is unclear what gases are

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needed for which electrode to meet the claim limitations. Is the choice one of a fuel gas and one of a oxygen gas that is supplied just to the anode or are each of the gases supplied to each of the proper respective electrodes, such as the fuel to the anode and the oxygen to the cathode or is the combination of one of the fuel and one of the oxygen supplied to both electrodes? Claims dependent upon claims rejected under 35 U.S.C. 112 are rejected for the same.

2. Claims 2, 3 & 5-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 2, the addition of the word "type" to an otherwise definite expression extends the scope of the expression so as to render it indefinite (MPEP 2173.05). Claims dependent upon claims rejected under 35 U.S.C. 112 are rejected for the same.

3. Claims 7-9 & 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claims 7-9, it is unclear if the fuel battery as a whole contains not more than 50 vol.% of the group or if the anode, which is part of the fuel battery, contains a sub-ingredient that is not more than 50 vol.% of the group. Claims dependent upon claims rejected under 35 U.S.C. 112 are rejected for the same.

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4. Claims 7-9 & 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claims 7-9, the statement "selected from the group of" is improper Markush language. The phrase should read, "selected from the group consisting of". Claims dependent upon claims rejected under 35 U.S.C. 112 are rejected for the same.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3 & 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over *A Low-Operating-Temperature Solid Oxide Fuel Cell in Hydrocarbon-Air Mixtures* (Hibino) in view of GB 1113949 (General Electric Co.).

Hibino discusses a solid electrolyte fuel cell, which conducts oxygen ions. The fuel cell inlet supplies both electrodes with a mixed gas reactant of oxygen and fuel. The anode comprises a mixture of a ceramic material, such as yttria-stabilized zirconia (YSZ) and nickel (Pg. 203).

Hibino is silent to the use of lithium with the nickel and the amount vol.% of the ceramic material.

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General Electric Co. teaches a solid electrolyte fuel cell with an anode comprising a mixture of lithiated nickel oxide and a stabilized zirconia ceramic. The amount of ceramic material is less than 50 vol.% (Pg. 2, ln. 100 – Pg.3, ln. 13). The lithiated nickel oxide increases the electrical conductivity of the electrode by several orders of magnitude over that of nickel oxide (Pg. 3, ll.93-98).

Regarding claims 5 & 6, the limitations are product-by-process and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (MPEP 2113). The lithium is added to the nickel oxide in a proportion of 10 atomic percent lithium in the metal species and then the compound is fired (Pg. 2, ll. 100-130).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the anode of Hibino with the lithiated nickel oxide of General Electric Co. to improve the performance of the fuel cell by increasing the electrical conductivity of the anode by several orders of magnitude.

6. Claims 1-3 & 5-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *A Low-Operating-Temperature Solid Oxide Fuel Cell in Hydrocarbon-Air Mixtures* (Hibino) in view of US Patent 3,503,809 (Spacil).

The teachings of Hibino as discussed above are incorporated herein.

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Hibino is silent to the use of lithium with the nickel, the amount vol.% of the ceramic material and the porosity of the anode.

Spacil teaches solid oxide electrolyte fuel cell with an anode having a mixture of lithiated nickel oxide and ceramic material such as yttria-stabilized zirconia (3:25-30, 3:75-4:15). The amount of ceramic material in the anode is less than 50 vol.%. The anode has a porosity range of 5-30 vol. % (2:47-53). The lithiated nickel oxide improves the adhesion of the anode layer to the electrolyte layer (4:65-75).

Regarding claims 5 & 6, the limitations are product-by-process and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (MPEP 2113). The lithium is added to the nickel oxide in a proportion of 10 atomic percent lithium in the metal species and then the compound is fired.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the anode of Hibino with the lithiated nickel oxide of Spacil to improve the adhesion of the electrode layer to the electrolyte layer, which would improve the electrical connection by reducing internal resistance between layers and therefore improve the performance of the fuel cell.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Trainer, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

  
SUSY TSANG-FOSTER  
PRIMARY EXAMINER